

Instructions for Downloading Garmin data into ArcView

Special emphasis on Alaska NPS Users

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<http://web/rgr/rgr2.htm> (Alaska NPS Intranet)

<http://165.83.48.21/rgr/rgr2.htm> (NPS-wide Intranet)

Background: There are many ways to incorporate Garmin GPS data into ArcView. Recent (2/12/2003) updates to DNR Garmin have allowed Alaska NPS ArcView users whose base data is *unprojected* in NAD27 Datum and is displayed in projected views to fully utilize the capabilities of this extension.

DNR Garmin is an ArcView extension and Visual Basic (VB) program developed by Minnesota Dept. of Natural Resources that integrates ArcView and most modern Garmin handheld GPS receivers. Basic highlights of the program include:

- ❖ Download and upload of waypoints, tracks and routes from Garmin receivers via the PC serial (COM) port
- ❖ Allow for saving Garmin data in a variety of projection and datum choices
- ❖ Saving of shapefiles independent of ArcView
- ❖ Calculates Circular Error Probable (CEP)*
- ❖ Real-Time Tracking*

* Calculation of CEP and Real-Time Tracking only work with projected datasets.

Since 1994, the Alaska Support Office (AKSO) has been deploying and successfully using various GPS units throughout the state. Depending on the job, accuracy requirements and GIS integration needs of the application, there are several low cost, rugged Garmin units that may fit the job. Please refer to <http://web/rgr/gps/tips.htm> for a list of recommended Garmin GPS receivers.

Garmin GPS receivers log C/A code and are not differentially corrected. The USFS has characterized several popular Garmin receivers under various canopy conditions. Please refer to <http://www.fs.fed.us/database/gps/whatsnew.htm> for a better understanding of stand-alone accuracy of these units.

Download and Installation of DNR Garmin

Download:

- 1.) **Download** the DNR Garmin extension and program from the Minnesota Department of Natural Resources :
<http://www.dnr.state.mn.us/mis/gis/tools/arcview/extensions/DNRGarmin/DNRGarmin.html> or if you have downloaded the GarminToolkit navigate to :
:\GPSTOOLBOX\GarminToolKit03\DNRGarminV4
- 2.) **Unzip** the program "dnrgarmin4.zip" to a common directory. The following three files will extract:
 - ❖ Dnrgarmin4setup.exe = program installation
 - ❖ Instmsia.exe – Windows installer for 95, 98,2000,XP
 - ❖ Instmsiw.exe – Windows installer for NT.

Installation:

- 1) If previous DNR Garmin program exists, **go to Step 2. Otherwise go to Step 5.**
- 2) Uninstall any previous versions of DNR Garmin by using the Start | Control Panel | Add/Remove Programs tool
- 3) Perform a search on local drives for all files named dnrgarmin.* If found, remove.
- 4) Perform a search on local drives for all files named pcogarmin.* If found, remove.
- 5) Navigate to the download folder and double-click “dnrgarmin4setup.exe”.
- 6) Read and accept the license agreement. Press Next to continue.
- 7) The program will install itself on “c:/program files/dnrgarmin” folder. It is suggested that you keep this location. Press Next to continue.
- 8) The program will install both a desktop shortcut and 11 files in the c:/program files/dnrgarmin folder. Press Finish and view the readme file supplied with the program
- 9) To enable the ArcView extension, navigate to c:/program files/dnrgarmin and copy the “dnrgarmin.avx” extension file to the ArcView extension folder. Normally found \ESRI\AV_GIS30\ARCVIEW\EXT32\.
- 10) **Alaskan** users must do one additional step to ensure proper datum transformation occurs between raw WGS84 GPS data and NAD27 based projections.
 - ❖ Navigate to c:/program files/dnrgarmin folder and rename the following files:

Conus.dbf	→	Conusbak.dbf
Conus.prm	→	Conusbak.prm
Alaska.dbf	→	Conus.dbf
Alaska.prm	→	Conus.prm
- 11) Installation is complete

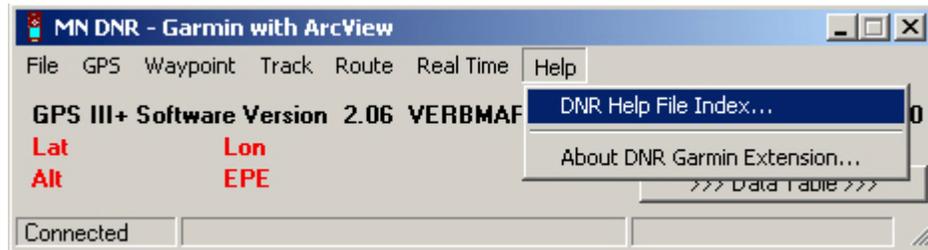
Installation Troubleshooting Guide:

- 1) You must have administrative privileges to install this program in the c:/program files directory. Contact your system administrator if installation was stalled because of installation rights.
- 2) If you have an earlier version of the DNR Garmin program on your machine you may need to uninstall before installing the new version. Uninstall previous versions by using the Start | Control Panel | Add/Remove Programs tool.
- 3) For other installation errors please refer to Minn. DNR Help page at <http://thoreau.dnr.state.mn.us/mis/gis/tools/arcview/Training/WebHelp/Trainin g.htm#DNRExt/DNRGarmin2/GPSIntro.htm>

DNR Garmin Quick Start

This simple guide will get you started with downloading the Garmin GPS receiver. There is excellent help available by either navigating to c:/program files/dnrgarmin and clicking on the help file called "DNRGarmin.chm "

or accessing Help from DNR Garmin Menu



Requirements:

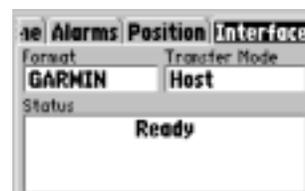
- ❖ Garmin GPS receiver: Successfully tested Garmins include 12, 12XL, 12CX, 12Map, eTrex Vista, eTrex Legend, 76, Map76, Map168 Sounder, II, III+, 38, 45, 196, Garmin V.
- ❖ PC Download Cable
- ❖ Available COM (Serial Port)
- ❖ ArcView 3.X
- ❖ GIS Theme Manager 2.05 (current version Feb 2003) or 2.04.

TIP:

DNR Garmin can run outside of ArcView (from the desktop shortcut Icon or Start | Programs | DNR Garmin) and store both shapefiles and text files, but you will be limited to storing data in decimal degree WGS84 Datum. Although this approach allows downloading capability without GIS, you will have to transform the stored data to NAD27 eventually for display with Alaska NPS data or risk 100's of meters of datum shift error. You can alleviate the datum shift error by running DNR Garmin INSIDE of ArcView through the extension load method.

A. Setup GPS

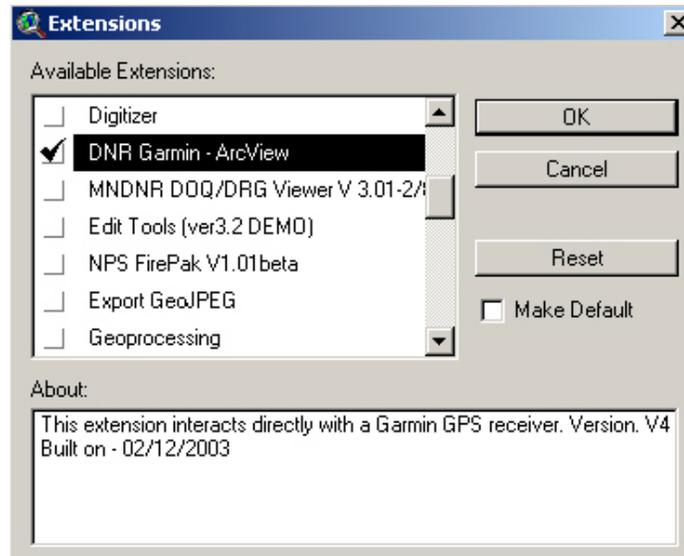
- 1.) **Connect GPS receiver** to the PC serial port using the PC Download cable
- 2.) **Turn on the GPS receiver** by pressing the red light button.
- 3.) **Setting Garmin in Simulator mode** (press Menu button once, select Start Simulator and press enter) This allows the receiver to send info to the program and allows the GPS to work indoors.
- 4.) **Set to Garmin Protocol** by entering Setup (Press Menu Menu) and scrolling to the Interface tab.



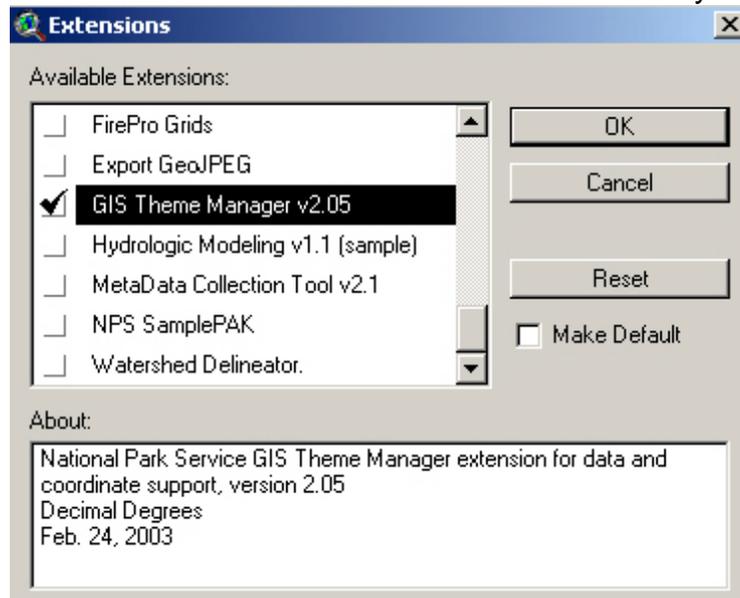
B. Setup ArcView - Load GIS Theme Manager and DNR Garmin Extension

Alaskan users should load both the GIS Theme Manager extension and DNR Garmin to prevent any missteps on projections. Contact your park GIS Specialist to ensure you have the latest version of the GIS Theme Manager (v. 2.05) on your network or local copy.

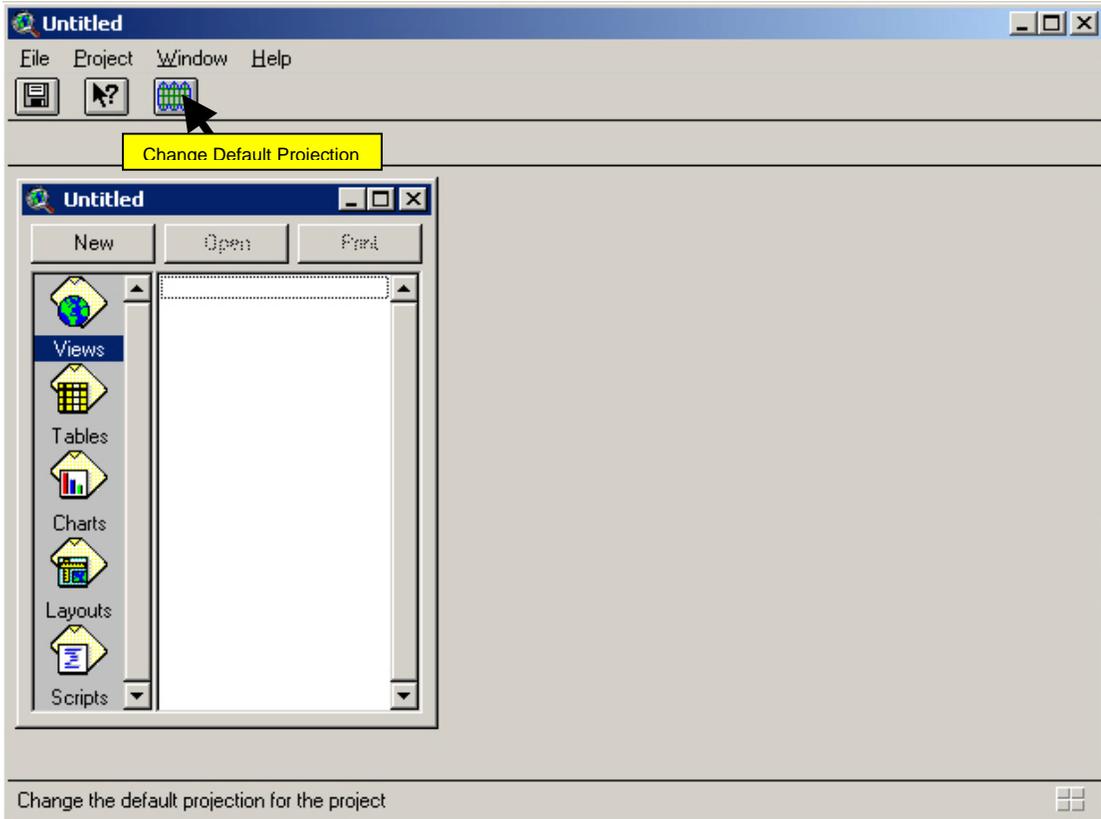
- 1.) **Open Extensions** by starting ArcView and selecting File | Extensions...
- 2.) **Select DNR Garmin** from available list and place a check mark in the box left of the extension name. If you do not see "DNR Garmin – ArcView", copy the dnrgarmin.avx from the c:/ program files/dnrgarmin directory to the extension folder (typically C:\ESRI\AV_GIS30\ARCVIEW\EXT32).



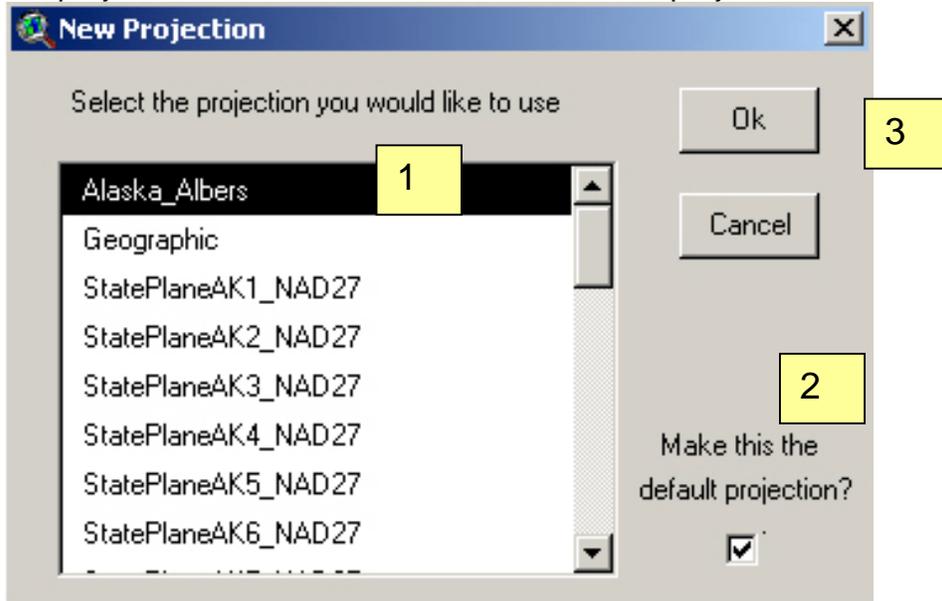
- 3.) **Select GIS Theme Manager v2.05** from the extension list and place a check mark in the box left of extension name. Other extensions may be checked.



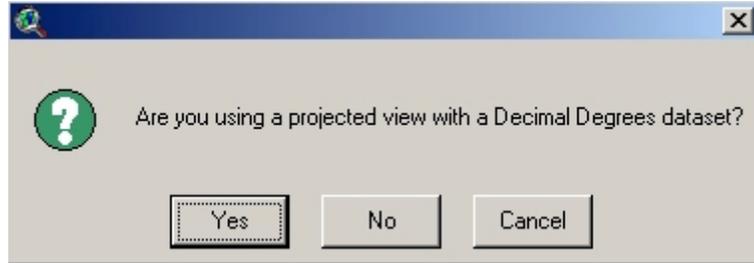
- 4.) The GIS Theme Manager is now projection-less by default. To set the view projection for your Park, make the Project document active and click on the button shown here



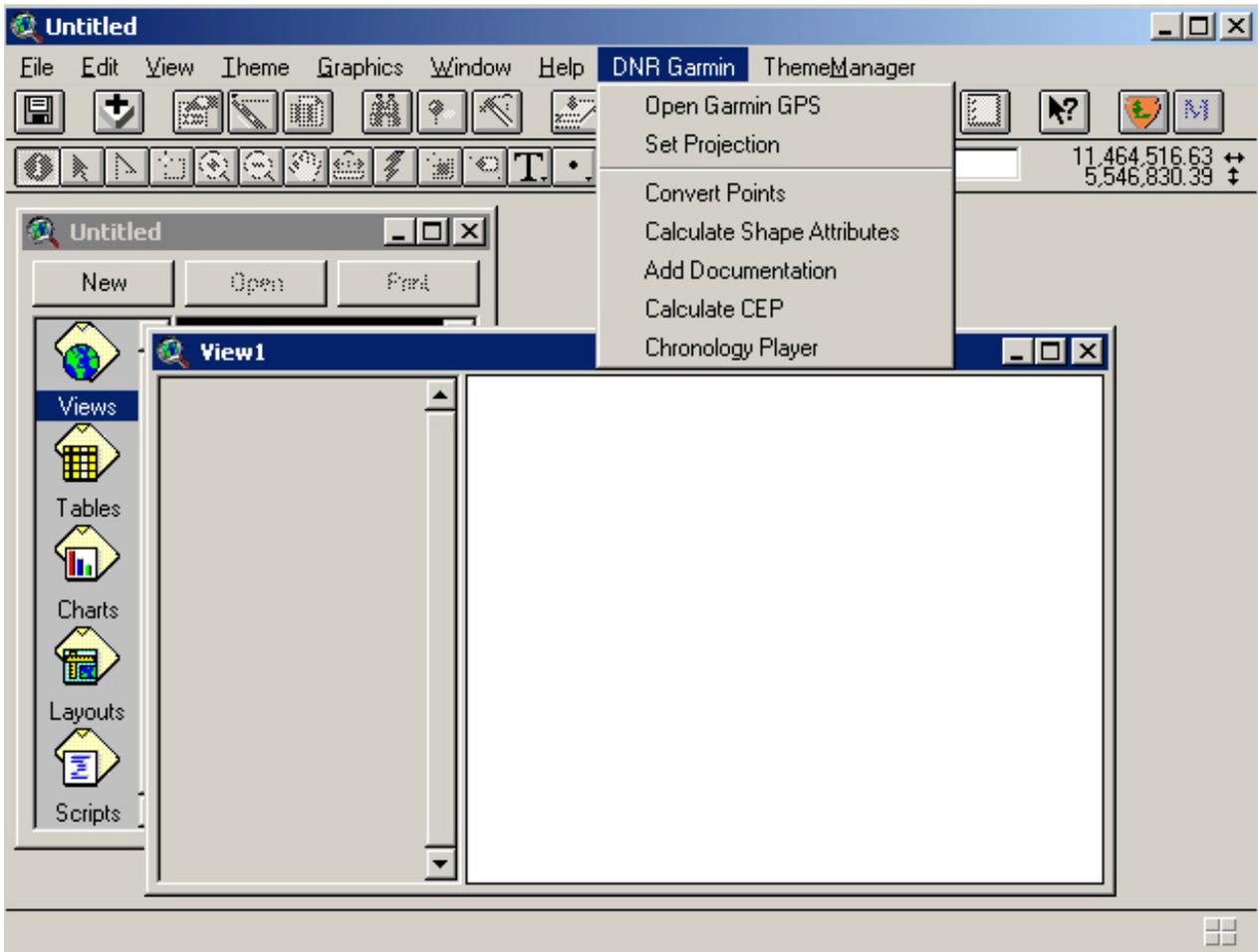
- 5.) To set the default projection for all future sessions of ArcView, select the projection, Press the “Make this the default projection?” button and press OK.



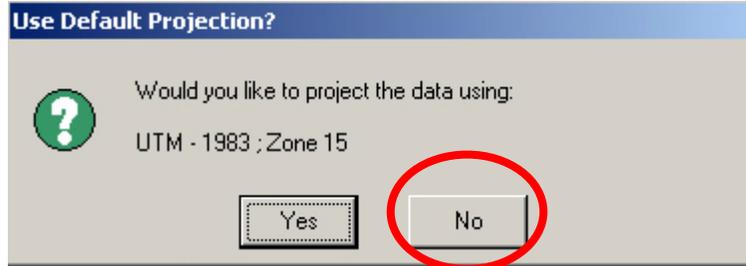
- 6.) Answer Yes to the next dialog box indicating that you are using a projected view with a Decimal Degree (Geographic) dataset. Check with your Park GIS Specialist or the GIS Team if you need more information.



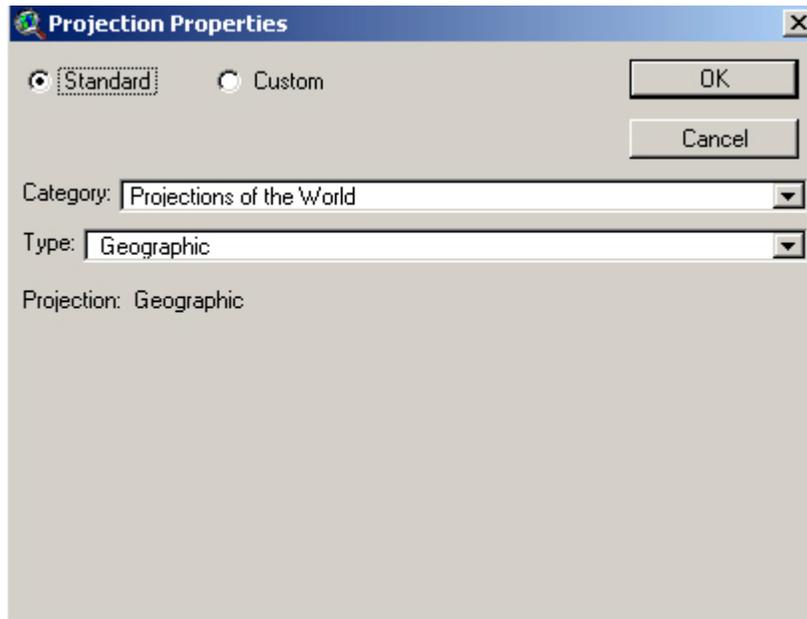
- 7.) Press OK on the next dialog box indicating a Projection Change has occurred.
- 8.) **Open a New View** and a new menu will appear to the left of the ThemeManager Menu choice. This is the DNR Garmin Menu offering seven choices. The second option, Set Projection must be selected now to ensure projection parameters are set properly for DNR Garmin.



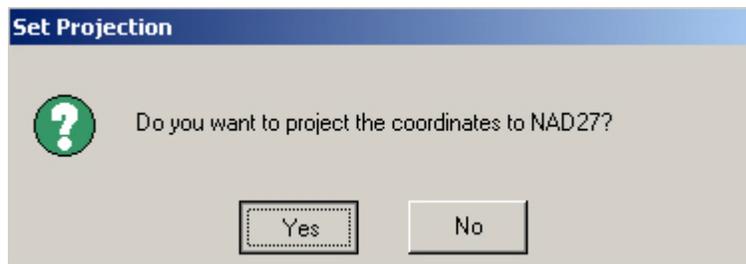
- 9.) **Click DNR Garmin | Set Projection** to tell ArcView what to do with the GPS data when it is transferred to ArcView. If this is the first time you have started DNR Garmin you will be asked to use the projection preferred by Minnesota DNR users, UTM Zone 15, NAD83. Press NO when asked to use this projection



- 10.) **Change the Projection Properties** to "Projections of the World" and "Geographic" by Clicking on Standard button and selecting the following options. Press OK when finished.



- 11.) **Select Yes** when asked to project the coordinates to NAD27. This step will allow the proper datum shift to occur for lining up GPS data with ArcView data layers.

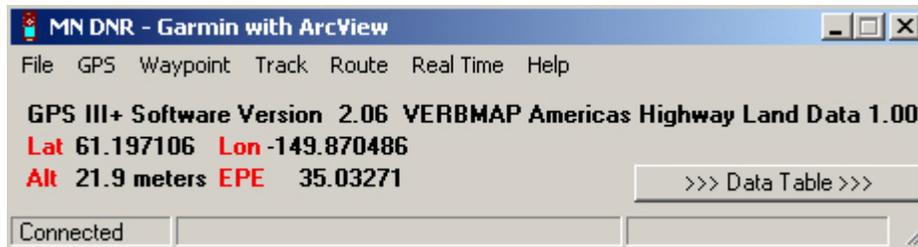


TIP: Once you have set these properties in both GIS ThemeManager and DNR Garmin, you will not have to change them for the particular PC you are on. These projection steps, though painful, must be altered everytime you load this extension on a laptop for the field or another PC. Contact the GIS Team for help.

You are now ready to connect to the Garmin GPS and download data.

C. Connect to GPS

- 1.) **Select Open Garmin GPS** from the DNR Garmin Menu. The DNR application will attempt to connect to a GPS via the serial port. If this is the first time you have used the program you may need to specify the correct port and setting under the GPS | Assign Port Menu.



Connection Troubleshooting Guide:

If DNR Garmin cannot connect to a GPS, you will get the following message.

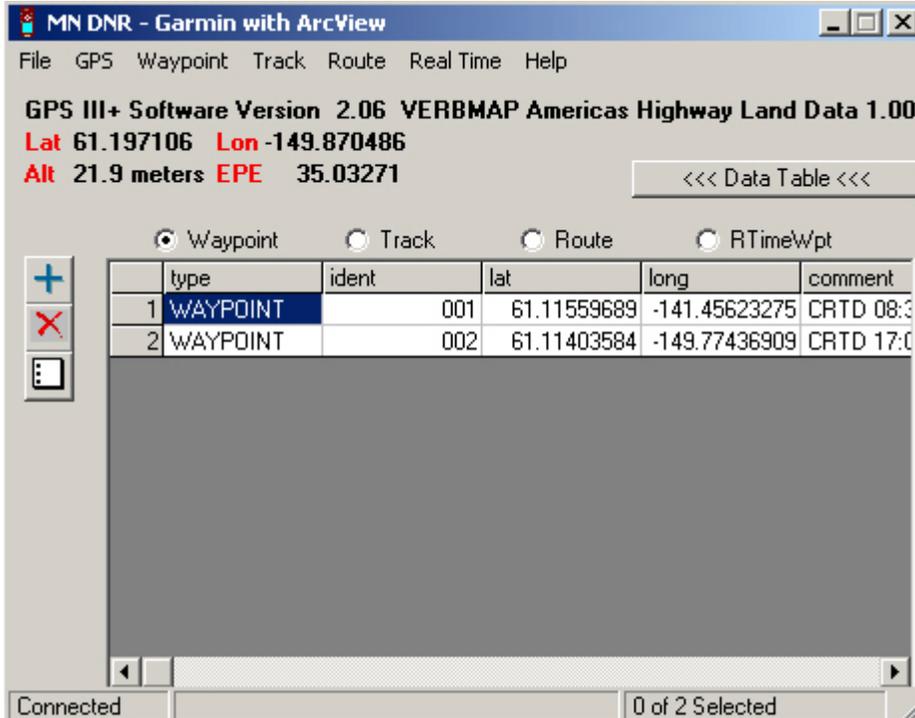
Check the following:

- ❖ Proper cable connection.
- ❖ Confirm Interface tab is set to Garmin.
- ❖ Disable programs such as Active Sync that may be accessing the same port.
- ❖ Select another available COM port by clicking on GPS | Assign Port Menu.

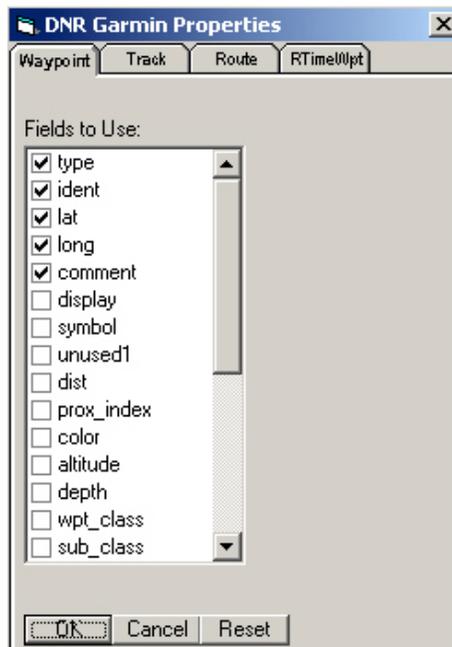
Retry connection by selecting GPS | Open Port.

D. Download Data: A quick guide to download waypoints and Tracks.

1.) **Waypoints:** To download waypoints from the Garmin receiver select Waypoint | Download. All stored waypoints will be transferred to DNR Garmin and can be seen in the Data Table.



You can edit various elements in the table including columns or rows. You may find extraneous columns of data that are unnecessary to import into ArcView. Remove these columns by selecting Waypoint | Waypoint Properties and un-selecting boxes. At a minimum, keep the following Fields: Type, Ident, Lat, Long, Comment, Model. Press OK when finished.



Save waypoint data as a ShapeFile by selecting File | Save To | ArcView | Shapefile and entering the waypoint shapefile name. Since this shapefile will be a geographic NAD27 waypoint shapefile it is recommended to name the shape with this information somewhere in the name of the file: Examples of a shapefile name:

- ❖ Studysites_DD_NAD27
- ❖ Transect_DD_NAD27

The shapefile will be added into the Active View. Click on the theme You may also save the waypoint data as a comma de-limited text file.

2.) **Tracks.** To download tracks from the Garmin receiver select Tracks | Download. All Active and stored tracks will be transferred to DNR Garmin and can be seen in the Data Table. As with waypoints, you may hide unnecessary fields by selecting Track | Track Properties. From this view you can preview, edit the values for tracks. The beginning of track segments are highlighted in blue and indicate a time break between track collection.

The screenshot shows the 'Data Table' window in the 'MN DNR - Garmin with ArcView' application. The table contains the following data:

	type	ident	lat	long	new_seg	time	m
1	TRACK		61.11404657	-149.77435836	True	12/31-00:00:00	G
2	TRACK		61.13726377	-149.77437981	False	12/31-00:00:00	G
3	TRACK		61.13745689	-149.77440127	False	12/31-00:00:00	G
4	TRACK		61.13752127	-149.77461595	False	12/31-00:00:00	G
5	TRACK		61.13754272	-149.84173545	False	12/31-00:00:00	G
6	TRACK		61.13769293	-149.84313020	False	12/31-00:00:00	G
7	TRACK		61.13801479	-149.84431037	False	12/31-00:00:00	G
8	TRACK		61.13923788	-149.84696342	False	12/31-00:00:00	G
9	TRACK		61.13962412	-149.84705695	False	12/31-00:00:00	G
10	TRACK		61.14091158	-149.84737881	False	12/31-00:00:00	G
11	TRACK		61.14108324	-149.84703549	False	12/31-00:00:00	G

Additional interface details: The window title is 'MN DNR - Garmin with ArcView'. The menu bar includes 'File', 'GPS', 'Waypoint', 'Track', 'Route', 'RealTime', and 'Help'. The status bar shows 'Connected' and 'Received 49 of 49 track points'. The 'Data Table' button is visible in the top right.

Save tracklog data as a ShapeFile by selecting File | Save To | ArcView | Shapefile. You may save the tracklog as a point, line or polygon shapefile entering the track shapefile name. Since this shapefile will be a geographic NAD27 waypoint shapefile it is recommended to name the shape with this information somewhere in the name of the file: Examples of a shapefile name:

- ❖ fireperim_DD_NAD27
- ❖ Transect_DD_NAD27

TIP: . You have the maximum flexibility in converting Garmin tracklog data to polygons by selecting points and deleting unwanted features. Use the AlaskaPak extension to convert points to poly.